

WHAT IS CLAIMED IS:

1. A diode structure, comprising:

a first conductive type substrate;

a second conductive type first well region located within the substrate;

5 a first conductive type second well region located within the first well region;

a second conductive type first doped region located within the first well region and detached from the second well region but adjacent to the surface of the substrate; and

10 a first conductive type second doped region and a second conductive type third doped region located within the second well region and adjacent to the surface of the substrate, wherein the second doped region is located between the first doped region and the third doped region but detached from both the first doped region and the third doped region.

15 2. The diode structure of claim 1, wherein the first doped region and the second doped region are coupled to a drain terminal and the third doped region is coupled to a ground terminal.

3. The diode structure of claim 1, wherein the diode further comprises a shallow trench isolation region set between the first doped region and the second doped region
20 and between the second doped region and the third doped region and set adjacent to the surface of the substrate.

4. The diode structure of claim 1, wherein the first conductive type is an n-doped type and the second conductive type is a p-doped type or vice versa.

5. A diode string structure, comprising:

a first conductive type substrate;

at least two diode structures located within the substrate, wherein each diode structure comprising:

5 a second conductive type first well region located within the substrate;

a first conductive type second well region located within the first well region;

10 a second conductive type first doped region located within the first well region and detached from the second well region but adjacent to the surface of the substrate; and

a first conductive type second doped region and a second conductive type third doped region located within the second well region and adjacent to the surface of the substrate, wherein the second doped region is located between the first doped region and the third doped region but detached from both the
15 first doped region and the third doped region.

6. The diode string structure of claim 5, wherein the third doped region of each diode is coupled to the first doped region and the second doped region of a following diode.

20 7. The diode string of claim 6, wherein the first doped region and the second doped region are coupled to a drain terminal and the third doped region is coupled to the first doped region and the second doped region of the following diode if the diode is the first diode in the diode string.

8. The diode string of claim 6, wherein the third doped region is coupled to a ground terminal and the first doped region and the second doped region are coupled to

the third doped region of a previous diode if the diode is the last diode in the diode string.

9. The diode string of claim 5, wherein the diode string further comprises a first shallow trench isolation region set between neighboring diode structures and adjacent to the surface of the substrate.

10. The diode string of claim 5, wherein the diode string further comprises a second shallow trench isolation region set between the first doped region and the second doped region and between the second doped region and the third doped region and adjacent to the surface of the substrate.

11. The diode string of claim 5, wherein the first conductive type is a p-doped type and the second conductive type is an n-doped type or the first conductive type is an n-doped type and the second conductive type is a p-doped type.

12. A diode string structure, comprising:

a first conductive type substrate;

a second conductive type first well region located within the substrate;

at least two diode structures located within the first well region and each diode comprising:

a first conductive type second well region located within the first well region;

a first conductive type second doped region and a second conductive type third doped region located within the second well region and adjacent to the surface of the substrate, wherein the first doped region and the second doped region are detached from each other; and

a second conductive type first doped region located within the first well region at a starting terminal of the diode string, wherein the first doped region is detached from the second well region but adjacent to the surface of the substrate.

13. The diode string structure of claim 12, wherein a third doped region of each
5 diode structure is coupled to the second doped region of a following diode.

14. The diode string structure of claim 13, wherein the second doped region and the first doped region are coupled to a drain terminal and the third doped region is coupled to the second doped region of the following diode if the diode is the first diode in the diode string.

10 15. The diode string of claim 13, wherein the third doped region is coupled to a ground terminal and the second doped region is coupled to the third doped region of a previous diode if the diode is the last diode in the diode string.

16. The diode string of claim 12, wherein the diode string further comprises a first shallow trench isolation region set between neighboring diode structures and
15 adjacent to the surface of the substrate.

17. The diode string of claim 12, wherein the diode string further comprises a second shallow trench isolation region set between the first doped region and the third doped region and between the first doped region and the second doped region and adjacent to the surface of the substrate.

20 18. The diode string of claim 12, wherein the first conductive type is a p-doped type and the second conductive type is an n-doped type or the first conductive type is an n-doped type and the second conductive type is a p-doped type.